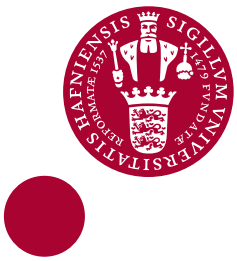

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Progress toward Equitably Managed Protected Areas in Aichi Target 11: A Global Survey

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The Convention on Biological Diversity Aichi Target 11 requires its 193 signatory parties to incorporate social equity into protected area (PA) management by 2020. However, there is limited evidence of progress toward this commitment. We surveyed PA managers, staff, and community representatives involved in the management of 225 PAs worldwide to gather information against 10 equity criteria, including the distribution of benefits and burdens, recognition of rights, diversity of cultural and knowledge systems, and processes of participation in decision-making. Our results show that more than half of the respondents indicated that there are still significant challenges to be addressed in achieving equitably managed PAs, particularly in ensuring effective participation in decision-making, transparent procedures, access to justice in conflicting situations, and the recognition of the rights and diversity of local people. Our findings are a first and fundamental contribution toward a global assessment of equitable management in PAs to report on Aichi Target 11 in 2020 and help define the next set of PA targets from 2020–2030.

Keywords: Aichi Target 11, access to justice, decision-making, rights

Aichi Target 11 (AT11) under the Convention on Biological Diversity (CBD) promotes the establishment and management of protected areas (PAs) in a socially equitable manner. Social equity is a multidimensional concept of ethical concerns that refers to fairness and is closely related to social justice (Friedman et al. 2018). Equity entails support for all members of society in proportion to what they initially have or what they need to reach a target or minimum that they are entitled to (Law et al. 2017). The CBD (2010) states that, as a minimum, "PAs should be established and managed in close collaboration with and through equitable processes that recognize and respect the rights of indigenous and local communities and vulnerable populations and such costs and benefits of the areas are fairly shared." The rationale behind equity concerns in PAs is that benefits arising from PAs are experienced at multiple scales, including the global, whereas the burdens associated with PAs fall predominantly on local stakeholders (Adams et al. 2004).

Significant progress has been made to operationalize frameworks to assess social equity in PAs (Sikor et al. 2014, Schreckenberg et al. 2016, Dawson et al. 2017). Three dimensions of social equity are recognized in this literature: distribution (of burdens and sharing of benefits from the establishment and management of PAs), procedure (how and by whom decisions are taken about the distribution of burdens and sharing of benefits), and recognition (acknowledgment and representation of different local stakeholder's ability to participate in decisions and have their rights, cultural identities, values, and knowledge systems recognized; see box 1). However, a global assessment of progress with regard to these equity dimensions in PAs, key to reporting on CBD AT11, is still lacking.

Measuring equity in PA to report on AT11 faces a significant methodological challenge: Equity is associated with concepts of social justice and fairness, respecting that diverse people could have different perceptions and views about what is fair. Metrics must recognize that tolerable and morally acceptable differences in society regarding equity exist (Schlosberg 2007, Pascual et al. 2014, Martin et al. 2015). The challenge has led to the development of a variety of methodologies and metrics employed in specific PAs assessments (see de Lange et al. 2016 for a review of the methods of social impacts of PAs), which do not allow for standardization and comparison to facilitate reporting at the global level, as is required for AT11. Social equity–related measures assessed by management effectiveness tracking tools (Leverington et al. 2010, Coad et al. 2015) do not account for the multidimensional

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Box 1. Social equity and its multiple dimensions in PAs.

Notions of *equity* are constructed within historical and cultural contexts and often refer to fairness: A subjective or perception-oriented notion of what is "fair," shaped by a range of social principles and considerations (Franks et al. 2018, Friedman et al. 2018). Equity is a concept deeply connected to issues of environmental justice (which emerged as a social movement in response to the disproportionate number of environmental burdens in communities of poorest people). In PAs, it generally pertains to the idea that benefits from nature conservation are shared globally, whereas the burdens of conservation are felt locally. It is associated with the notion that PAs should, at least, have no negative impact on local people in their establishment and management (or it should be compensated) and, where possible, should contribute to a reduction in inequity experienced by vulnerable people within or around PAs (Convention on Biological Diversity 2010).

Distributional equity refers to the fair distribution of benefits and burdens. Fairness about distribution is associated with a culturally specific idea of tolerable and morally acceptable differences in society. In the PAs context, it implies people agree on the scheme for the sharing.

Procedural equity refers to how agreements about distribution of benefits and burdens are decided, through formal and informal processes. In PAs these processes are associated with governance of PAs. Transparency, accountability in management actions, access to mechanisms of justice for solving conflicts and the people's capacity for effective participation in decision-making are crucial for achieving procedural equity.

Equity as recognition has a long philosophical and political history and it refers to the respect of identity and social and cultural differences in society. In PAs, it entails the recognition of all stakeholder groups who could have a say in decision-making processes, and the acknowledgement and respect for their views and values, cultural identities, customary rights, understandings and practices of nature management and traditional knowledge.

character of equitable management in PAs (Corrigan et al. 2017, Moreaux et al. 2018).

Our aim in this study is to provide an initial contribution to address the mentioned challenge through a global survey among key stakeholders involved in 225 PAs worldwide and to provide a preliminary multidimensional assessment of social equity in PAs to report on AT11. First, we piloted a survey about social equity to key stakeholders involved in the management of 225 PAs worldwide. To do this, we developed an online questionnaire based on 10 social equity criteria for PAs and distributed this to managers, governmental, and nongovernmental organization (NGO); PAs staff; community representatives; and academics. Second, we used the results of the survey to explore whether the perception of the respondents about the performance of social equity criteria differs across governance types in PAs, management categories, subsamples of stakeholders, and regions by continents. Third, we considered contextual factors at a national and regional level that could facilitate or hamper social equity in PA management. On the basis of this analysis, we discuss some of the main challenges that remain for assessing social equity in PAs to report on AT11 by the 2020 deadline and suggest ways forward and targeted actions toward achieving more equitably managed PAs.

Measuring progress towards equitably managed PAs

We used 10 criteria of multidimensional social equity in our survey (Zafra-Calvo et al. 2017): sharing of benefits; actions to mitigate burdens; accountability; access to justice; transparency; satisfaction with participation in decision-making; free, prior, and informed consent mechanisms (FPIC); recognition of cultural diversity and values; respect for statutory and customary rights; and recognition of local traditional knowledge systems. We created a questionnaire to gather information about these 10 criteria of social equity (for details about the creation of the metrics and the full questionnaire, see Zafra-Calvo et al. 2017). The questionnaire was reviewed by 10 experts, policymakers associated with the CBD, and conservationist NGOs. It was sent first to a sample of 20 PAs. Then, an adjusted online version of the questionnaire in English, Spanish, and French was sent to stakeholders associated with PA management using the networks of the United Nations Environment Programme's World Conservation Monitoring Centre; the International Union for Conservation of Nature; private protected areas; indigenous and communities conservation areas; the World Wildlife Fund; BirdLife International; the Wildlife Conservation Society; the Satoyama Initiative; Europarc Federations; the UN Educational, Scientific, and Cultural Organization; and the Critical Ecosystem Partnership Fund, and it was also spread via social media. We did not target specific people, and responses to the questionnaire were on a voluntary basis. The questionnaire was sent to about 4000 people, and we obtained 241 responses corresponding to 225 PAs from 88 countries (see figure S1 and table S1 in supplemental appendix S1 for details; the responses were gathered from 1 June to 31 August 2016). Questionnaires were answered by 45 PA managers (government, private, and community-managed PAs), 16 representatives of local communities and indigenous people, 47 NGOs, 59 government staff working in PA management, 2 private organizations running businesses in PAs, 34 academics conducting research in PAs, and 38 other PA staff such as consultants or subcontractors.

For each social equity criterion, the questionnaire responses were scored according to the extent that the

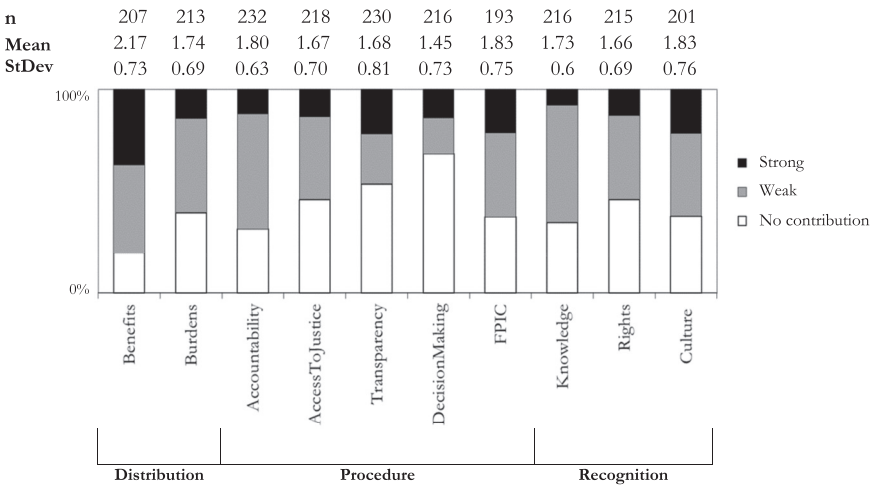

Figure 1. Mean and standard deviation of responses to the 10 criteria across the three dimensions of social equity (n = 122). Social equity criteria were scored according to the responses to the questionnaire with a minimum value of 1 (the establishment or management of the PA is perceived as not contributing to achieving a given social equity criteria), 2 (the establishment or management of the PA is perceived as having a weak contribution toward achieving a given social equity criteria), to 3 (the establishment or management of the PA is perceived as having a strong contribution toward achieving a given social equity criteria). Columns present the distributions of the frequency of the responses as the percentage of the occurrences of each score (no contribution, weak, strong).

management of the PA became more equitable (CBD 2010): 1, the establishment or management of the PA is perceived by the respondent as not contributing to achieving equitably managed PAs; 2, the establishment or management of the PA is perceived as having a minimum contribution to achieving the criteria of equitably managed PAs (*do not harm*); and 3, the establishment or management of the PA is perceived by the respondent as having a strong contribution to achieving equitably managed PAs. Additional comments on the responses provided details about the score assigned to the criteria assessed in each of the PAs. Details about the systematized metrics selected to measure each of the criterion and its limits can be found in Zafra-Calvo and colleagues (2017).

We calculated the mean and standard deviation of the social equity scores from the questionnaires reaching at least a 50% completion threshold (n = 232) in order to present an overall picture of the situation perceived by the respondents regarding each of the 10 social equity criteria. The sample represents 0.11% of PAs worldwide and corresponds to a balanced proportion of existing IUCN categories and governance types (UNEP-WCMC and IUCN 2016; for details, see supplemental appendix S2).

We statistically explored the data using those questionnaires in which all questions were answered (n = 122). Spearman's rank correlation tests were used to explore associations among the social equity scores and to test the association between social equity scores and five contextual factors that can influence social equity in any given sociocultural and economic context, as defined by Schreckenberg and colleagues (2016). These contextual factors included the Gini index of inequality (GINI), the International Property Rights Index (IPRI), the Rule of Law Index (RLI), the Corruption Index (CI), and the Freedom and Democracy Index (FDI; for details, see supplemental appendix S3). We used Kruskal–Wallis to test for statistically significant differences among the scores obtained for each criterion: among the four IUCN PAs governance types (Borrini-Feyerabend et al. 2013)—governed by government (97 PAs), shared governance (14), privately governed (seven), or governed by local communities (four)—and among four IUCN management categories (Dudley 2008)—strict conservation (categories Ia+Ib; 10 PAs), national park (category II; 52), less restricted PAs with sustainable use of natural resources or protecting people–nature interactions in broader landscapes (categories V and VI; 33), and other categories (categories III and IV and unassigned to IUCN categories; 27). We also used Kruskal–Wallis tests to identify differences among the scores of the social equity criteria among regions (United Nations Statistics Division 2014)—Africa (21 PAs), America (32), Asia (23), Europe (40), Oceania (6)—and among the diverse stakeholders who responded to the questionnaire (see details in appendix S2). All of our tests were performed in R using the rcorr function in the package hmisc (Harrell et al. 2006), the cor.test function in the package psych of R (Revelle 2016), and the function kruskal.test of the package stats in R (R Core Team 2013), respectively.

How far we are in achieving equitably managed PAs

The mean and standard deviation of the scores obtained from the survey for the 10 social equity criteria are illustrated in figure 1. Satisfaction with the decision-making processes received the lowest scores (decision-making, mean [M] = 1.45, SD = 0.73) with almost 70% of the respondents indicating that the management of the assessed PAs did not contribute to a satisfactory decision-making. This was followed by a perceived general loss of rights over natural resources by local stakeholders with the establishment of PAs (rights, M = 1.66, SD = 0.69), an inadequate access to mechanisms to solving disputes (access to justice, M = 1.67, SD = 0.70), and a lack of transparency in sharing information about how decisions were made (transparency, M = 1.68, SD = 0.81). About 50% of the respondents perceived that the assessed PAs did not contribute to achieving these three

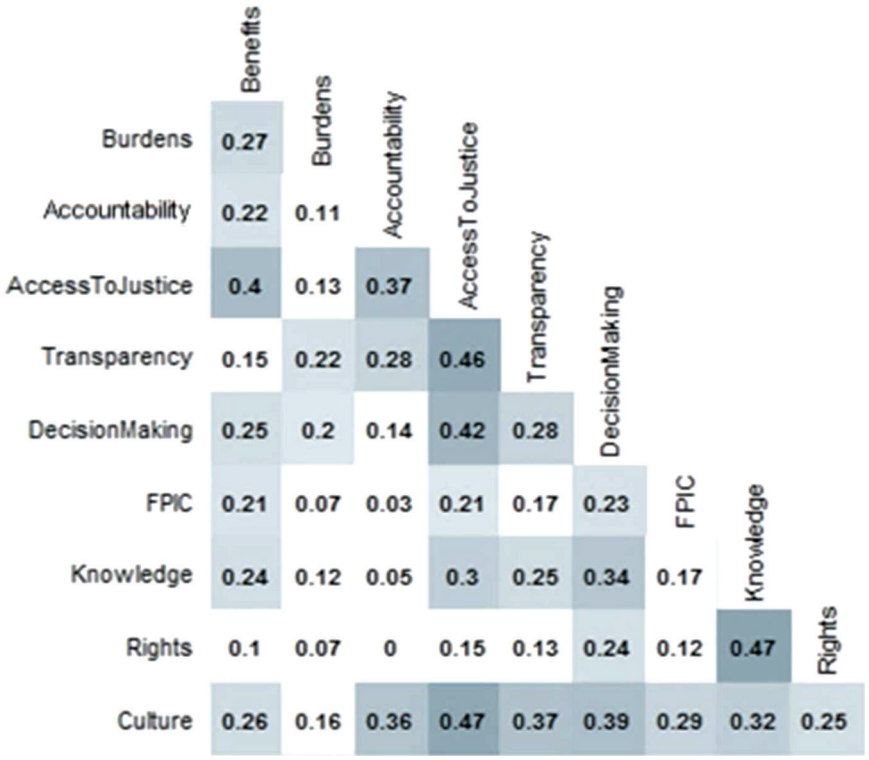

Figure 2. Spearman correlation coefficients show the association between the 10 criteria of social equity in PAs (n = 122). The values in the squares show the correlation coefficients (r_s) between two criteria of social equity. Where a statistically significant association exists (p < .05), the squares are shades of gray (a higher correlation is shown as a darker shade of gray); where an association is not statistically significant, the squares are white.

criteria of social equity. Sharing of benefits received the highest score (benefits, M = 2.17, SD = 0.73), with about 80% of the respondents perceiving that PAs have shared the benefits arising from their establishment and management.

All correlations between social equity criteria were positive, suggesting that an improvement in one score is linked to an improvement in another (figure 2). The strongest associations were between the recognition of the diversity of values and local cultures (culture) and the ability to satisfactorily resolve disputes in relation to conflicts arising from PA management (access to justice, $r_s = .47$, $p < .001$). In addition, increased conflict-resolving capacity by local stakeholders (as *access to justice*) was positively associated with greater transparency in the sharing of information about the management of PAs (transparency, r_s = .46, p < .001), people more satisfied about their participation in decision-making processes (decision-making, r_s = .42, p < .001), and a higher access to benefits derived from the PAs (benefits, r_s = .40, p < .001). Acknowledgement of the value of traditional knowledge systems was also positively correlated with the recognition of local people's rights (rights, r_s = .47, p < .001).

We found significant differences among PA management categories in relation to the distribution of burdens (Kruskal–Wallis $\chi^2(122,3) = 25.21$, $p = .00$) and local people's ability to access mechanisms to address conflicts and attain justice (access to justice, Kruskal–Wallis χ^2 (122,3) = 9.52, p = .02). More strictly managed PAs performed worse in terms of these two criteria. None of the respondents considered the current actions to mitigate burdens and access to justice in strict conservation PAs was contributing to achieving equitably managed PAs. We also found significant differences among PA governance type in the distribution of burdens (Kruskal–Wallis $\chi^2(122,3)$ = 8.13, p = .04). None of the respondents indicated that the current actions mitigate burdens in community managed PAs enough to contribute to equitably managed PAs.

Of the factors associated with the socioeconomic and institutional context, we found a negative weak association (approximate r_s = .2, p < .001) between transparency scores and all the contextual factors except the GINI index and between the Corruption Index and access to justice, transparency, knowledge, and rights. We found geographical differences in transparency (Kruskal–Wallis $\chi^2(122,4)$ = 15.95, p < .001), FPIC (Kruskal–Wallis $\chi^2(122,4)$ = 11.17, p = .02) and rights (Kruskal–Wallis $\chi^2(122,4)$ = 11.01, p = .02) by continent. FPIC and transparency performed best in Oceania (specifically, Australia), whereas rights performed best in Europe and worst in Africa and Oceania. We also found differences depending on the type of respondent regarding FPIC (Kruskal–Wallis $\chi^2(122,5)$ = 30.20, p = .00), with representatives of communities and managers reporting more frequently that FPIC was not obtained for a given PA, and access to justice (Kruskal–Wallis $\chi^2(5)$ = 11.40, p = .04). Academics, communities, and governmental staff more frequently reported conflicts and difficulty in accesses mechanisms of justice. Further details about social equity criteria across management categories, governance types, subsamples of stakeholders, regions by continents, and contextual factors are in appendix S2.

Coping with dynamic and multidimensional equity

Our data represent initial evidence for the complex picture of social equity in PAs at the global level to report on AT11. The particularity of our global assessment is that it addresses two crucial challenges. The first challenge is the compensability of the social equity criterion assessed (i.e., the assumption that a loss observed in one indicator can be compensated by a gain in another). To deal with this challenge, the performance of each criterion has been assessed separately,

Box 2. Participation in decision-making, transparency, access to justice, and recognition of the culture and rights of local people underpin equitably managed PAs.

Tanga Coelacanth Marine Park (Tanzania; 2090 square kilometers [km^2]) aims to deliver benefits to communities through a range of income generating activities (Wells et al. 2006). However, responses to the questionnaire showed that illegal dynamite fishing still persist, with influential people behind it and villagers employed to do it. Peoples' rights, in particular access to land to support their livelihoods are not respected by PA management authorities, even if villagers have lived there for centuries and have customary land rights recognized by law. Villagers are experiencing different forms of displacement without receiving proper compensation, not because of the PA establishment or management, but because of reported land speculation (a potential new port and oil pipeline). Villagers have much dissatisfaction about the evictions but they are too poor to protest and to access to the legal system. It has been also reported a lack of accountability, transparency and support to villagers by PA management authorities.

Hin Nam No National Protected Area (Lao People's Democratic Republic; 862 km^2) is managed in a multilevel collaborative governance system that has been recently assessed to provide insights to assist other PAs to become more equitable and effective (de Koning et al. 2017). At Hin Nam No, the PA authority of the government officially delegated certain management tasks to so-called guardian villages. Through responses to the questionnaire, it has been reported that many consultative meetings took place to draft the comanagement agreements, which were participatory, and the comanagement plan. There are official co-management committees that also represent the poor and vulnerable. However, one ethnic group is being excluded. Over the years, there has been an improvement in participation and decision-making, which is a huge step forward under current political circumstances. Guardian villages officially have access and use rights in the "controlled use zone," although most benefits go for village rangers for their work on biodiversity monitoring and patrolling and to eco-tourism providers.

avoiding the use of a synthetic index or aggregate value of social equity. In addition, disaggregated analysis of scores and the percentages of responses falling in each of the ranks of equitably managed PAs have been shown. This means that polarized responses will not be cancelled out by calculating average scores across multiple criteria. The second challenge refers to the commensurability of the social equity criteria assessed (i.e., the possibility to measure them through common metrics). Different local stakeholders within a given PA and the same ones in different historical, social, political and institutional contexts could hold different views about how much engagement is enough to deem a process equitable (Phelps et al. 2017). To address this challenge, we have carefully elaborated the metrics (for details and limits, see Zafra-Calvo et al. 2017) to focus on contribution of social equity criteria toward equitably managed PAs rather than establishing a normative state of social equity in PAs.

There are, however, a number of concerns regarding the approach that need to be considered. Given the online and mostly self-assessment nature of our survey, there is a risk of ending up with a picture of social equity in PAs that is biased, because it represents the particular perception of individual respondents to the questionnaire (Bennett 2016). The metrics that we employed to assess equity in PAs could be also combined with factual metrics (e.g., an increased number of marginalized groups of local stakeholders included in the board of management of the PA) to help track equity in PA performance and management. Furthermore, bias associated with the respondents' profiles has to be considered; our data did not include many potentially relevant stakeholders in each of the PAs assessed. The results should be considered with caution, because some social groups are overrepresented (e.g., managers), whereas others (e.g., indigenous communities' representatives) are not equally represented (they are about the 1%–2% of the total sample). In this sense, it will be crucial to harmonize global rapid assessments, like the one presented in this study, with site-specific, long-term social equity assessments of PAs (Franks et al. 2018) to specifically target such underrepresented stakeholders and social groups, including gender differentiation (Dawson et al. 2017).

Despite these challenges and concerns, we argue that this preliminary assessment provides relevant insights to support and guide policymakers and PA managers in addressing social concerns in the management of PAs to achieving AT11 commitments. The finding that participation in decision-making, transparency in sharing of information, and the existence of mechanisms to solve disputes get the lowest scores is not surprising, but it needs to be tackled urgently. Addressing these equity issues, however, could provide only a partial solution to achieving AT11. Our findings suggest that a lack of recognition and respect for the different cultural identities and groups that exist in a given PA is positively correlated with less access to justice to solve conflicts and with a less satisfactory participation in decision-making. This result could illustrate the persistence of the historical exclusion of relevant social actors and local stakeholder groups in decisions related to the management of PAs (Brockington and Igoe 2006, Durand et al. 2014), which leads to conflicts that hinder progress toward equitable managed PAs (Reed 2008, Martin et al. 2016; see box 2). The results also suggest that more access to the resolution of conflicts is perceived to be related to a more equitable sharing of benefits. Equitable benefit sharing is intimately linked to local stakeholders' ideas of what is morally acceptable in terms of access and control over resources, which differs by stakeholder group (Pascual et al. 2010). Benefit sharing is the social equity criterion that gets the highest scores in our survey toward equitably managed PAs, likely because

the distribution of economic benefits has been historically equated to equity in PAs (Ferranti et al. 2014).

Our study also suggests that those PAs whose main management goal is the strict conservation of biodiversity and ecosystem services (IUCN categories Ia and Ib) do not have enough actions in place to mitigate the burdens on local stakeholder groups (e.g., restricting access and use of natural resources; Dahlberg et al. 2010). This is also highlighted in PAs managed by communities. Strict PAs could also entail stronger enforcement that creates (real or perceived) challenges in mechanisms to managing and solving conflicts (Challender and MacMillan 2014). Achieving equitably managed PAs under all types of governance, management goals, and associated categories is a mandate of the CBD (2010). To operationalize this mandate, it is necessary to find ways to mitigate these conservation-related burdens suffered by local stakeholders without compromising the conservation goals of different categories of PAs (West et al. 2006, Lele et al. 2010, Dudley et al. 2016, Gray et al. 2016). A site-specific participatory surveying approach is needed to provide a more detailed description of the status of each PA in terms of social equity. This would allow negotiating and elaborate targeted management options able to navigate trade-offs between conservation goals and social equity in each of the PAs (Hirsch et al. 2011).

Finally, the contextual factors at the national scale have a generally weak association with the 10 equity criteria considered at PA level. This is in line with other studies showing that relationships between social and conservation issues are dynamic and mostly locally specific (Upton et al. 2008, Brooks et al. 2012).

Moving forward to engage PAs in equitable management: Post-Aichi Targets

Given the limited number of years left for the Aichi Targets to be achieved, our initial findings might be useful for an initial reporting against the 2020 deadline for AT11 and helpful in defining the role of social equity in the next CBD strategic plan from 2020–2030. To move forward with the assessment of agreed equity commitments in AT11, we suggest generating factual metrics of progress toward equitably managed PAs that may be integrated in well-established assessments of the performance of PAs, such as PAME tools. Subsequent efforts in perception-based surveys providing a global picture of equity may focus on administering the survey to the full set of local stakeholders in each of the PAs assessed. It could be done every year to track progress. In the analysis of the PA, factual and several perception-based assessments could be combined in a systematic and transparent approach. This approach should be the starting point of PA managers engaging with participatory site-specific evaluations able to better understand and interpret potential synergies, unavoidable trade-offs and conflicts in the equitable management of PAs. Finally, putting in place mechanisms to manage conflicts and elaborating targeted actions to reach socially equitable management in each of the existing PAs will be essential by 2020 and beyond.

Data availability

The data that support the findings of this study are available from the corresponding author on reasonable request.

Supplemental material

Supplemental data are available at *BIOSCI* online.

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